

ries,* Mr. Garrod has shown that the pulse-wave augments its rapidity as it gets further from the heart, a result which is specially interesting in connection with those of M. Marey on the undulations in closed tubes, the blood system being similar in all respects.

With reference to the changes of the height of the undu-

augmentation in its rapidity. This depends on the elasticity of the tube, which tends to distribute the pressure in the different parts of the liquid column.

It will be seen from Fig. 2 that the primary direct wave is followed by a more or less numerous series of secondary diminishing minor waves. They are dependent

on the rapidity with which the liquid is forced into the elastic tube. The reflected wave may also give rise to secondary undulations. The whole of the foregoing results are represented in a most vivid manner by the translation of their results stereoscopically or into a figure of three dimensions, represented in Fig. 3. We have never before seen results of a similar kind similarly depicted.

Among the other results arrived at by the employment of the same instrument, M. Marey has shown that *negative* waves, that is of absorption, obey exactly the same laws as do *positive* waves, or those of compression; also, in tubes opened at their distant end, if the aperture is large, no reflected wave is produced, at the same time that the intensity of the undulation diminishes from one to the other end, and its rapidity also gradually.

(To be continued.)

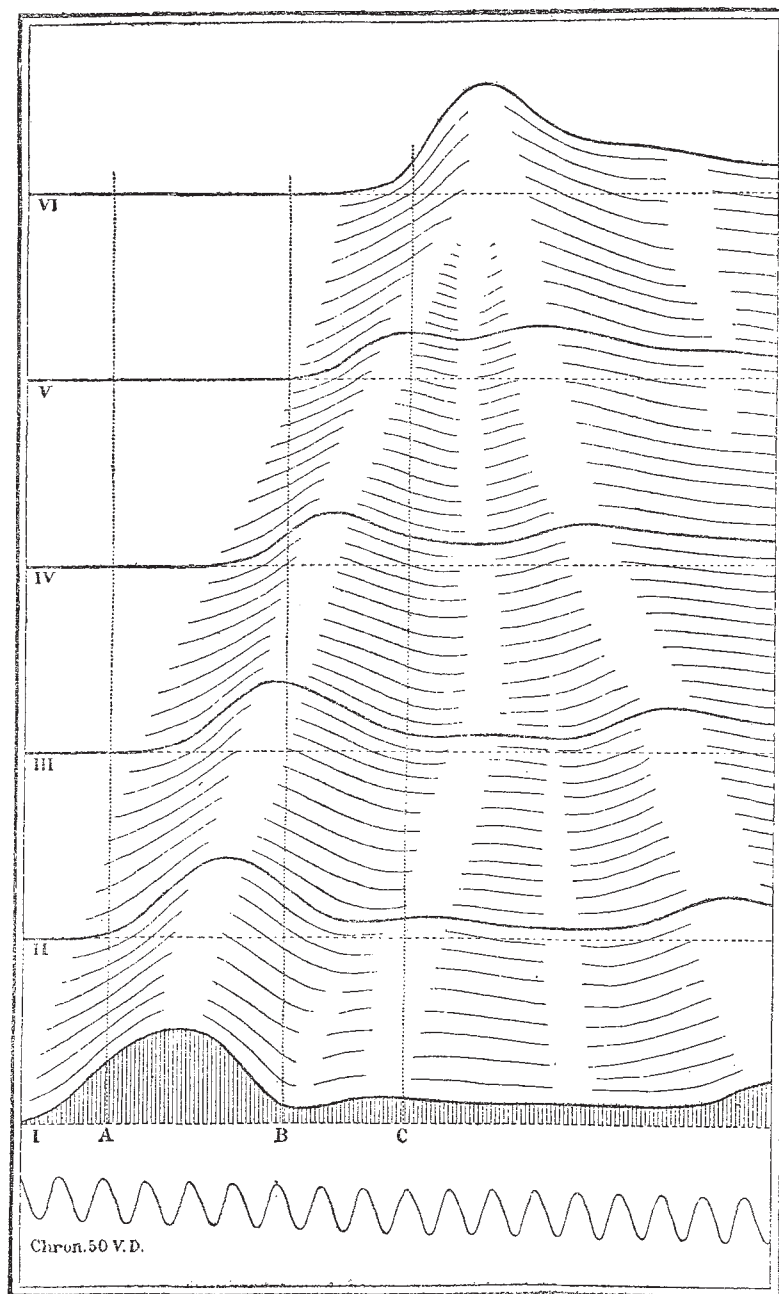


FIG. 3.

lation in different parts of its course, it can be proved that the wave has its maxima of intensity at its two ends, its minima in the intermediate part of its course. The wave also changes in form during its progress, this change consisting essentially in a diminution in its amplitude and an

valuable information conveyed, information in itself calculated to interest in a high degree any healthy mind, and which the compiler has had skill enough to put into shape without detracting from its interest.

While we congratulate the publishers on their successful attempt to elevate the quality of drawing-room litera-

* "Proc. Royal Soc.," 1875, p. 150.

THE ARCTIC WORLD
The Arctic World: its Plants, Animals, and Natural Phenomena.
(London and Edinburgh: Nelson and Sons, 1876.)

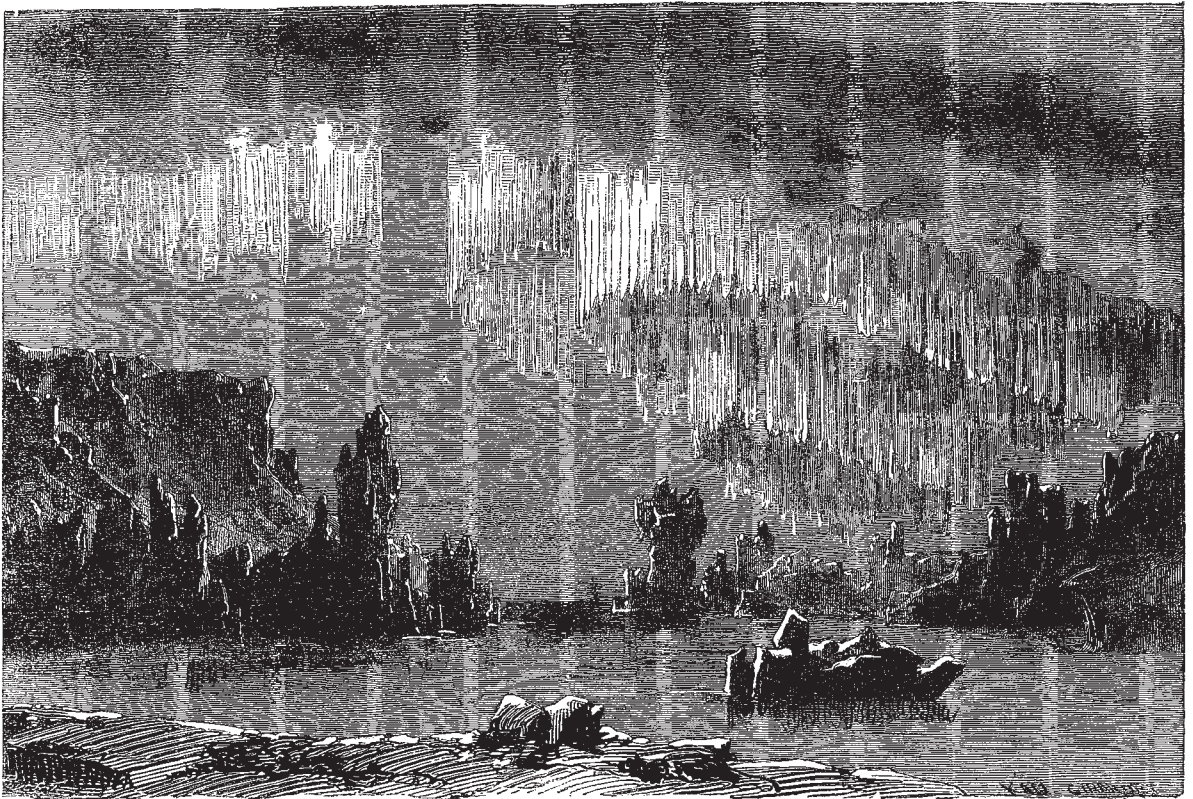
THE Messrs. Nelson have in the present work made a praiseworthy attempt at innovation on the usual style of drawing-room book; for that "The Arctic World" is meant mainly for the drawing-room table its whole appearance indicates. The work is something more than a mere picture-book, though its pictures are certainly a striking attraction. The compiler of the text has made an honest, and, we believe, remarkably successful, attempt to carry out the promise of the title-page, and present a satisfactory account of the physical phenomena, the plants, animals, people, and scenery of the entire round of the Arctic regions. There is really a great amount of solid and accurate and

ture, we also rejoice, in the interests of science, that they think there is some chance of such a work becoming a commercial success; for thus, in the judgment of practical men, there exists a considerable public who are able to understand, appreciate, and enjoy a work which is largely scientific in its character. This is an additional sign of the general advance in intelligence which has been going on in recent years, and of the fact that the results of scientific research are gradually taking a place in the public estimation of equal importance with the results of literary effort. We sincerely wish "The Arctic World" an extensive circulation; the publishers certainly deserve to be rewarded for the venture they have made.

Although the text is of substantial value, still,

the most striking feature in this beautifully got-up book is its pictures, which are most, if not all, of French workmanship, and are really beautiful in execution, with that touch of artistic exaggeration which the French manage to impart to the most commonplace woodcut. These pictures, upwards of 100 in number, render the work a most attractive one, and besides, of themselves, are calculated to convey not a little information concerning the Arctic regions, the varied life, animal and human, and scenery of which they represent with considerable fulness. They are in all respects so attractive, that they can be looked at over and over again without any diminution of interest.

In the first chapter the author points out briefly and



The Aurora Borealis.

forcibly the scientific and practical gains which may be expected from Arctic exploration, and which were fully set before the public in connection with the Arctic expedition, which no doubt is now upon or beyond the "threshold of the unknown region." He gives a short sketch of the geographical features of the Arctic region, of its surface in relation to snow and ice, and of the general character of life in the Polar World. In the second chapter an interesting account is given of some of the most striking phenomena of the region, the scenery, atmospheric phenomena, the aurora, and some of the most prominent astronomical features. The nature and formation of icebergs are pretty fully discussed in the next chapter, and the various forms of ice to be met with in the Arctic regions described; after which comes an interesting account of some of the

forms of animal life to be met with in the Polar Seas, and the methods of capturing it. Then follows a well-written account of the most trustworthy researches on the nature and formation of snow and ice in connection with the constitution and movements of glaciers. Vegetable life is described in Chapter V., as also the connections, habits, and uses of the principal land-animals and birds. A slight divergence is made in Chapter VI., in order to give a brief account of Iceland its scenery, its physical phenomena, and the life and character of the people; this chapter is written in a tone that Capt. Burton would probably think too highly pitched. In the three succeeding chapters the characteristics and mode of life of the various people who inhabit the Arctic regions are set forth with considerable

fulness. The Eskimo, the Lapps, the Samojedes, the Ostraks, the Jakuts, the Tungusi, the Tchuktche, the principal groups of people in short that inhabit Arctic America, Europe, and Asia, all come in for detailed notice, and that in a manner calculated both to interest and instruct. It is the same with respect to all the other matters referred to in the work: we are too apt when thinking of the Arctic World to limit the term to Greenland or Arctic America at most, forgetting how much more the term includes. In the present work the whole region within the Arctic Circle, all round, is included, and its various features, phenomena, and life described with greater or



Kamtschatkans.

less minuteness. The last chapter contains a brief *résumé* of the course of Arctic discovery.

The work altogether is one of the most interesting and trustworthy of its kind we have had the pleasure to come across; we do not know of any similar book which gives a more satisfactory account of the principal features of the Arctic World. Boys and girls we are sure would consider it a treasure; and to all old boys and full-grown girls who desire "something fresh" both to read and to look at, we can heartily commend it.

OUR BOOK SHELF

Notes of Travel in South Africa. By Charles John Andersson. Edited by L. Lloyd. (London: Hurst and Blackett, 1875.)

THOSE who are acquainted with the late Mr. C. J. Andersson's "Lake N'gami," "The Okovango River"—discovered by him—or any of his other writings, will gladly

avail themselves of the opportunity afforded by the "Notes of Travel" of again learning, from his own pen, other incidents in the short and far from uneventful career of the enterprising semi-Swedish traveller and fluent writer.

The posthumous "Notes" edited by Mr. Lloyd—who performed the same service with reference to another of Mr. Andersson's works, "The Lion and the Elephant"—contain, besides the descriptions of the habits of some few of the birds and animals of the districts in question, the account of the doings of the author during the last four or five years of his life, a period in which the political differences between the neighbouring South African tribes of Damaraland and Namaqua Land compelled him to devote more time to trade and the disputes which arose therefrom, than to geographical and biological research.

Not long after his marriage, in 1861, Mr. Andersson purchased of the Walwich Bay Mining Company, on the winding up of their affairs, their extensive establishment—Otjimbingue—in Damaraland, with the object of making it a trading station for cattle and ivory. In a war which arose between the Damaras and Namaquas Andersson found himself constrained to become the leader of the former; during this he sustained, from a bullet, a wound in the leg smashing the upper end of the right tibia and fibula, which was long in healing, and rendered him lame for the short remaining period of his life.

The great injury done to his trading operations, the loss of his stock, and the probability of further outbreaks, led the author, who was still suffering from his wound, and further incapacitated by repeated attacks of dysentery, in his enfeebled state, to entertain the idea of establishing favourable trading relations with the Portuguese settlers of Benguela, north of the river Cunene. With this object in view he left Cape Town, where he had spent some time on account of his health, in May 1866, once more for Damaraland. Namaqua marauders continued to harass him, and he started from Ondonga for the Cunene in May 1867. He reached that river in the middle of June; however, he never crossed it because of the bad treatment he received from the ferrymen and from his state of health, which will be best understood from his own note on the day following that on which he reached it. He died in the Ovampo wilderness, where he was buried by no one but a youthful and faithful attendant, Alex Ericson.

During his illness he spent much of his time in collecting the materials for a work on the ornithology of South-west Africa, a book which was to have been published in a profusely illustrated and otherwise costly form by Messrs. Day and Son. This important addition to our knowledge of the African avifauna the author never saw in print; but since his death it has been produced in a more unassuming form, under the able and careful editorship of Mr. J. H. Gurney, under the title of "The Birds of Damaraland;" now a standard volume of ornithological literature.

The notes on the habits and powers of the vulture will interest naturalists, as will the attempt to distinguish a second species of ostrich, said to differ from *Struthio camelus* in that the male bird is slightly larger, whilst the female is jet black, like the male, instead of greyish; and the young is of a sooty brown. *Machaerhampus anderssoni*, or Andersson's Perm obtained from Otjimbingue, is fully described, as are the Kori Bustard (*Eupodotis kori*), the Rufous-crested Bustard (*E. ruficrista*), Rupell's Bustard (*E. rupelli*), and a few other birds. Mr. Lloyd tells us in his preface that, among numerous papers, Andersson left behind him "Notices of several of the quadrupeds indigenous to Damaraland and the neighbouring countries." These it was his original intention to incorporate in the present work, but to preserve the continuity of the narrative they were, with the exception of a single chapter on the Leopard and its congeners, omitted, though not without hope that at some future